FIG. 1

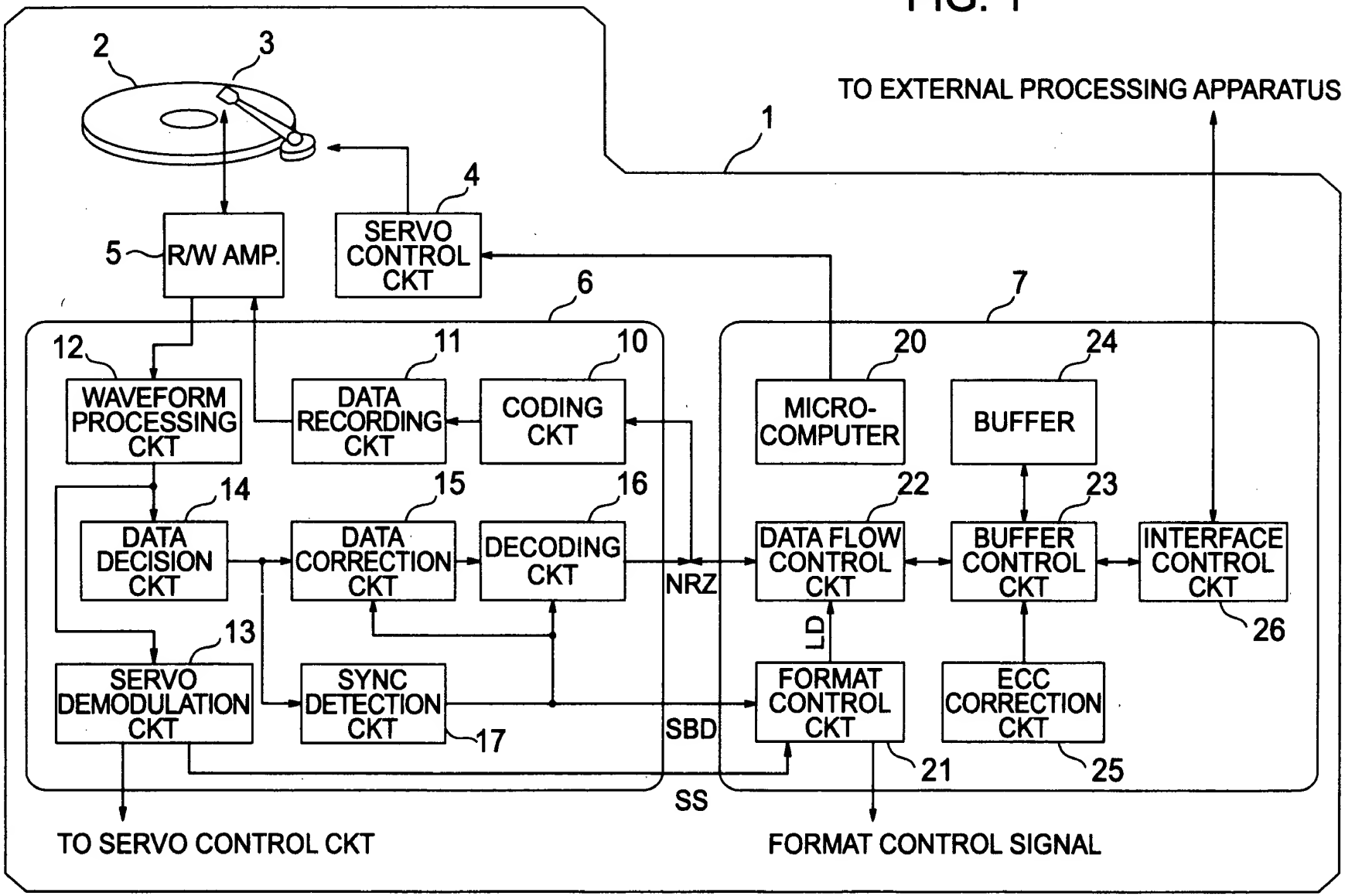
TO EXTERNAL PROCESSING APPARATUS
1
2
3
4
5
R/W AMP.
SERVO CONTROL CKT
6
7
12
WAVEFORM PROCESSING CKT
11
DATA RECORDING CKT
10
CODING CKT
20
MICRO-COMPUTER
24
BUFFER
14
DATA DECISION CKT
15
DATA CORRECTION CKT
16
DECODING CKT
NRZ
22
DATA FLOW CONTROL CKT
23
BUFFER CONTROL CKT
INTERFACE CONTROL CKT
26
LD
13
SERVO DEMODULATION CKT
SYNC DETECTION CKT
17
SBD
FORMAT CONTROL CKT
21
ECC CORRECTION CKT
25
SS
TO SERVO CONTROL CKT
FORMAT CONTROL SIGNAL

FIG. 2

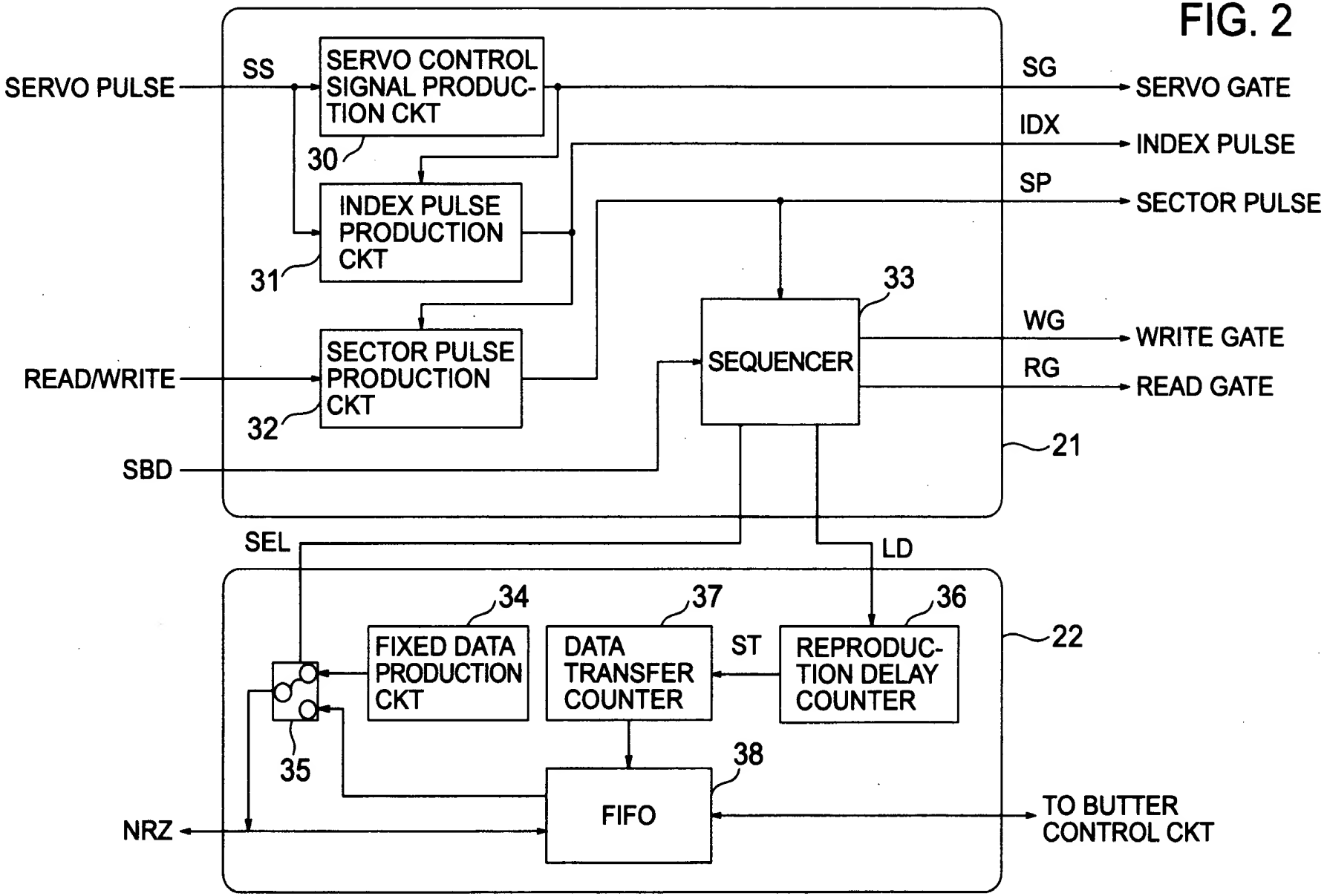
SERVO PULSE
SS
SERVO CONTROL SIGNAL PRODUCTION CKT
30
INDEX PULSE PRODUCTION CKT
31
SECTOR PULSE PRODUCTION CKT
32
READ/WRITE
SBD
SEQUENCER
33
SG
SERVO GATE
IDX
INDEX PULSE
SP
SECTOR PULSE
WG
WRITE GATE
RG
READ GATE
21
SEL
LD
34
FIXED DATA PRODUCTION CKT
37
DATA TRANSFER COUNTER
ST
36
REPRODUCTION DELAY COUNTER
22
35
38
FIFO
NRZ
TO BUTTER CONTROL CKT

FIG. 3A

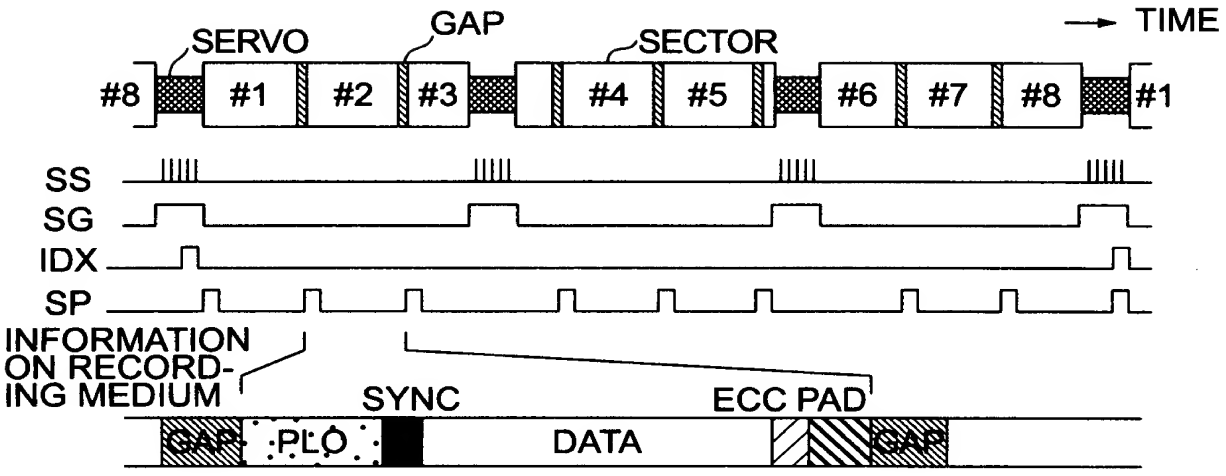

FIG. 3B

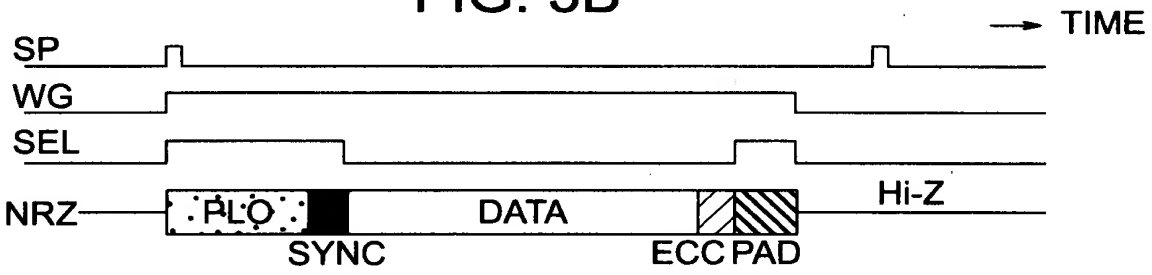

FIG. 3C

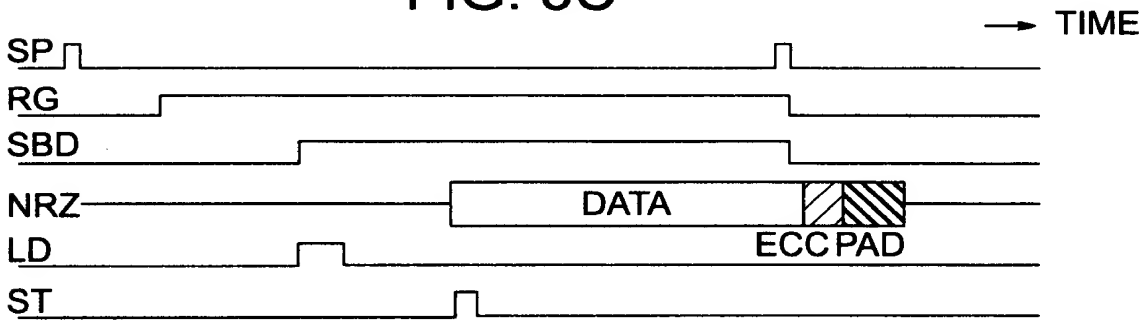

FIG. 4A

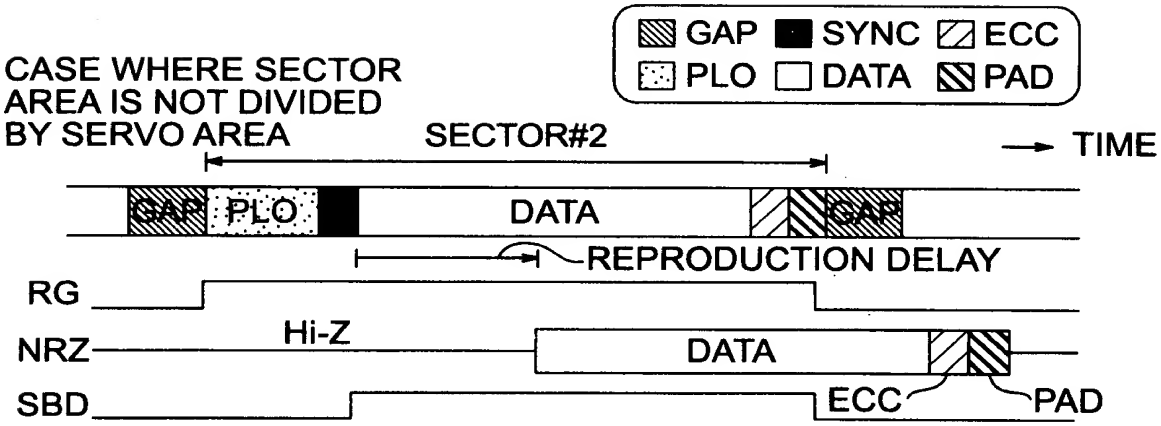
GAP
SYNC
ECC
PLO
DATA
PAD
CASE WHERE SECTOR AREA IS NOT DIVIDED BY SERVO AREA
SECTOR#2
TIME
GAP
PLO
DATA
GAP
REPRODUCTION DELAY
RG
NRZ
Hi-Z
DATA
SBD
ECC
PAD

FIG. 4B

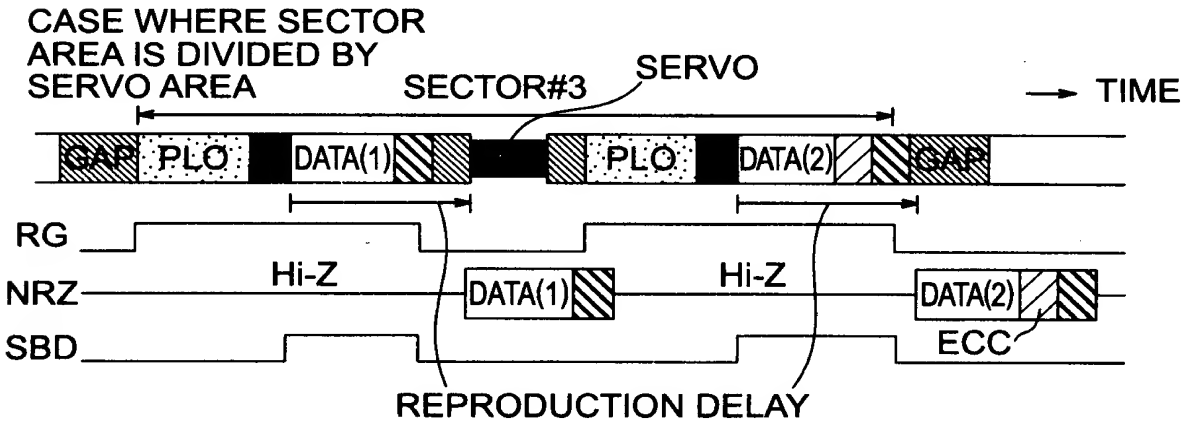
CASE WHERE SECTOR AREA IS DIVIDED BY SERVO AREA
SECTOR#3
SERVO
TIME
GAP
PLO
DATA(1)
PLO
DATA(2)
GAP
RG
NRZ
Hi-Z
DATA(1)
Hi-Z
DATA(2)
SBD
ECC
REPRODUCTION DELAY

FIG. 5A

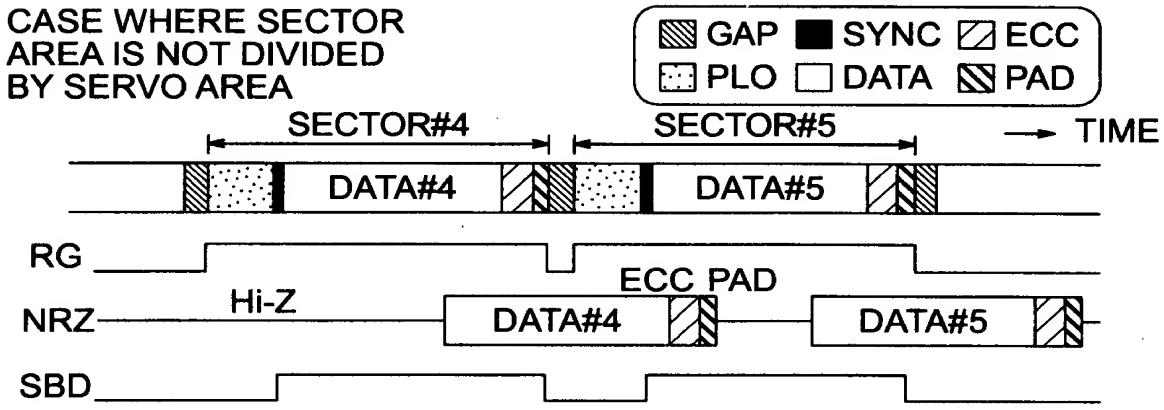
CASE WHERE SECTOR AREA IS NOT DIVIDED BY SERVO AREA
GAP
SYNC
ECC
PLO
DATA
PAD
SECTOR#4
SECTOR#5
TIME
DATA#4
DATA#5
RG
ECC PAD
NRZ
Hi-Z
DATA#4
DATA#5
SBD

FIG. 5B

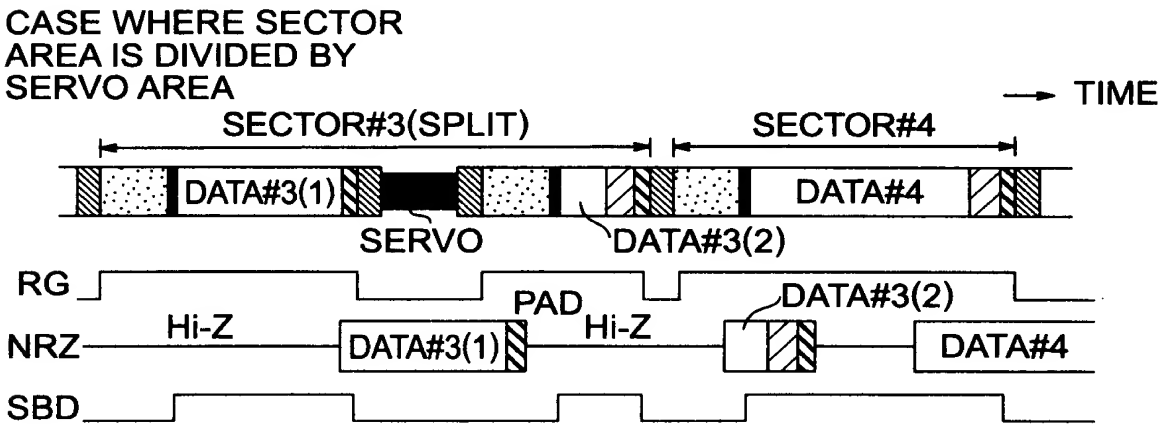
CASE WHERE SECTOR AREA IS DIVIDED BY SERVO AREA
TIME
SECTOR#3(SPLIT)
SECTOR#4
DATA#3(1)
DATA#4
SERVO
DATA#3(2)
RG
PAD
DATA#3(2)
NRZ
Hi-Z
DATA#3(1)
Hi-Z
DATA#4
SBD

FIG. 6A

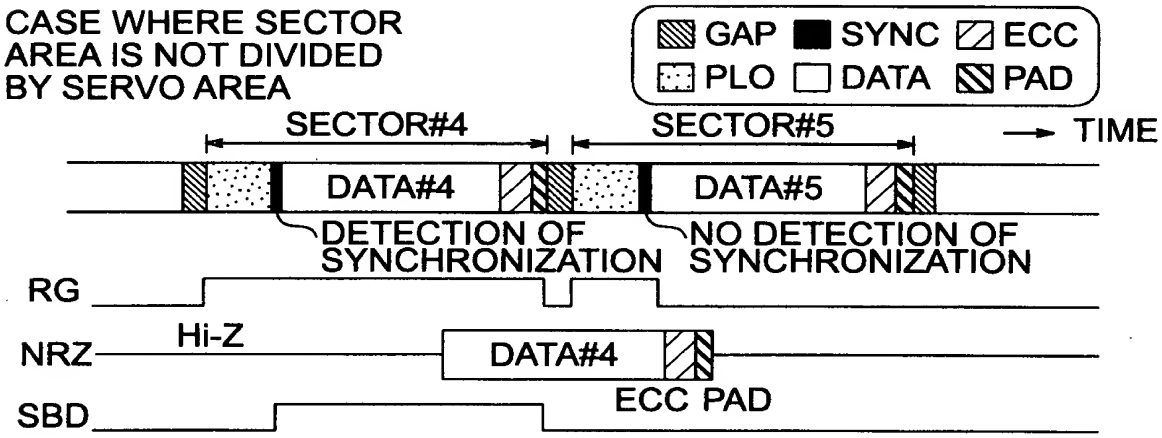
CASE WHERE SECTOR AREA IS NOT DIVIDED BY SERVO AREA
GAP
SYNC
ECC
PLO
DATA
PAD
SECTOR#4
SECTOR#5
TIME
DATA#4
DATA#5
DETECTION OF SYNCHRONIZATION
NO DETECTION OF SYNCHRONIZATION
RG
NRZ
Hi-Z
DATA#4
ECC PAD
SBD

FIG. 6B

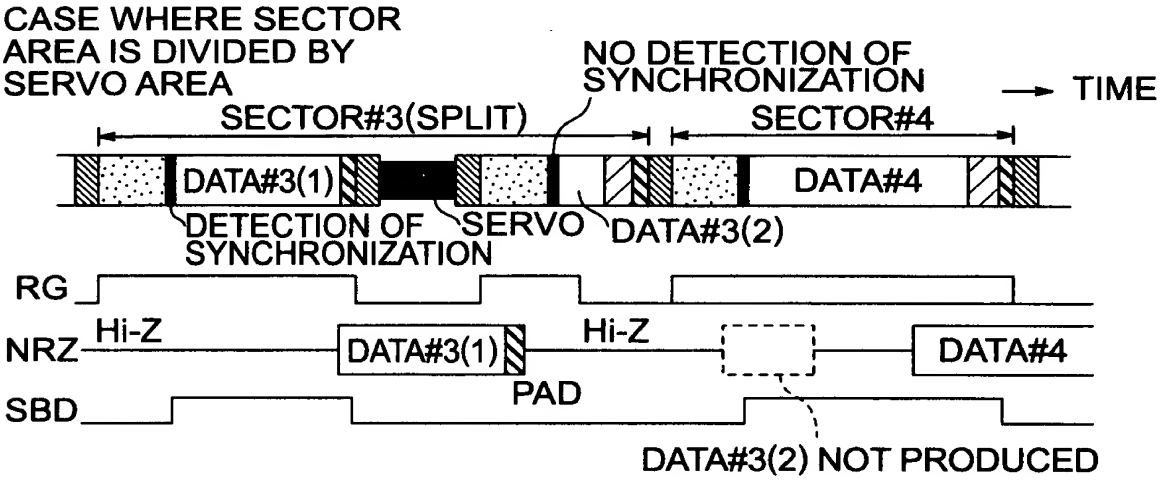
CASE WHERE SECTOR AREA IS DIVIDED BY SERVO AREA
NO DETECTION OF SYNCHRONIZATION
TIME
SECTOR#3(SPLIT)
SECTOR#4
DATA#3(1)
DATA#4
DETECTION OF SYNCHRONIZATION
SERVO
DATA#3(2)
RG
NRZ
Hi-Z
DATA#3(1)
Hi-Z
DATA#4
PAD
SBD
DATA#3(2) NOT PRODUCED

FIG. 7A

USUAL PROCESSING

	PROCESSING BY SEQUENCER 33	PROCESSING BY DATA FLOW CONTROL CKT 22
step1	ACTIVATE "RG" SIGNAL	CONTINUE WHEN DATA IS BEING TRANSFERRED
step2	SYNC DETECTED WITHIN FIXED PERIOD? ("SBD" SIGNAL=ACTIVE)	CONTINUE WHEN DATA IS BEING TRANSFERRED
step3	WAIT DURING PRESCRIBED NUMBER OF BYTES	WAIT DURING NUMBER OF REPRODUCTION DELAY BYTES AND THEN START TO TRANSFER DATA OF PRESCRIBED NUMBER OF BYTES
step4	INACTIVATE "RG" SIGNAL	CONTINUE WHEN DATA IS BEING TRANSFERRED
step5	WAIT UNTIL SERVO PERIOD PASSES	CONTINUE WHEN DATA IS BEING TRANSFERRED
step6	ACTIVATE "RG" SIGNAL	CONTINUE WHEN DATA IS BEING TRANSFERRED
step7	SYNC DETECTED WITHIN FIXED PERIOD? ("SBD" SIGNAL=ACTIVE)	CONTINUE WHEN DATA IS BEING TRANSFERRED
step8	WAIT DURING PRESCRIBED NUMBER OF BYTES	WAIT DURING NUMBER OF REPRODUCTION DELAY BYTES AND THEN START TO TRANSFER DATA OF PRESCRIBED NUMBER OF BYTES
step9	INACTIVATE "RG" SIGNAL	CONTINUE WHEN DATA IS BEING TRANSFERRED

FIG. 7B

EXCEPTIONAL PROCESSING(WHEN SYNC BYTE IS NOT DETECTED WITHIN PRESCRIBED TIME)

step1	INACTIVATE "RG" SIGNAL	CONTINUE WHEN DATA IS BEING TRANSFERRED
step2	NOTIFY OCCURRENCE OF DATA ERROR	CONTINUE WHEN DATA IS BEING TRANSFERRED

FIG. 8

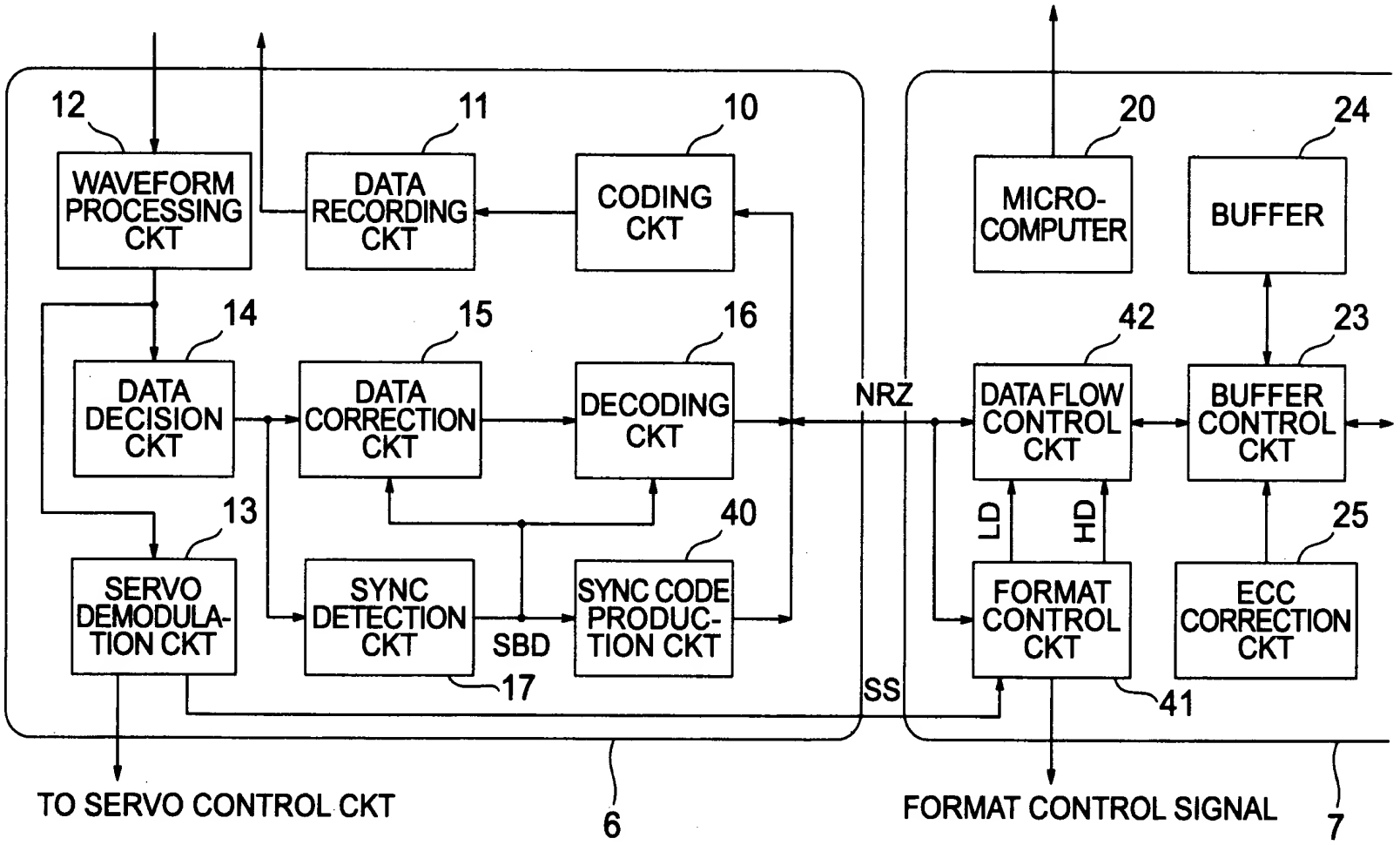
12
WAVEFORM PROCESSING CKT
11
DATA RECORDING CKT
10
CODING CKT
20
MICRO-COMPUTER
24
BUFFER
14
DATA DECISION CKT
15
DATA CORRECTION CKT
16
DECODING CKT
NRZ
42
DATA FLOW CONTROL CKT
23
BUFFER CONTROL CKT
13
SERVO DEMODULA-TION CKT
SYNC DETECTION CKT
SBD
17
40
SYNC CODE PRODUC-TION CKT
LD
HD
25
FORMAT CONTROL CKT
ECC CORRECTION CKT
SS
41
TO SERVO CONTROL CKT
6
FORMAT CONTROL SIGNAL
7

FIG. 9A

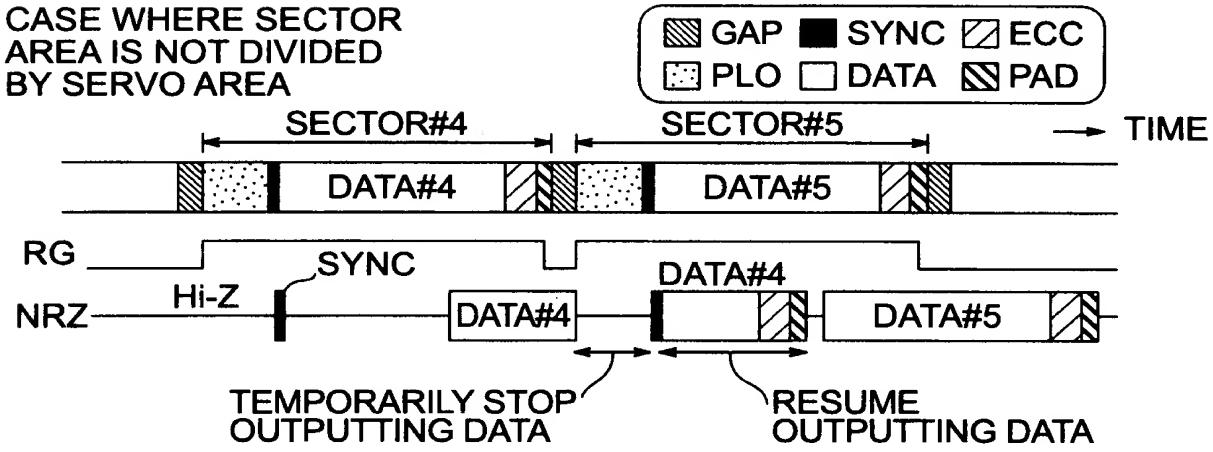
CASE WHERE SECTOR AREA IS NOT DIVIDED BY SERVO AREA
GAP
SYNC
ECC
PLO
DATA
PAD
SECTOR#4
SECTOR#5
TIME
DATA#4
DATA#5
RG
SYNC
DATA#4
NRZ
Hi-Z
DATA#4
DATA#5
TEMPORARILY STOP OUTPUTTING DATA
RESUME OUTPUTTING DATA

FIG. 9B

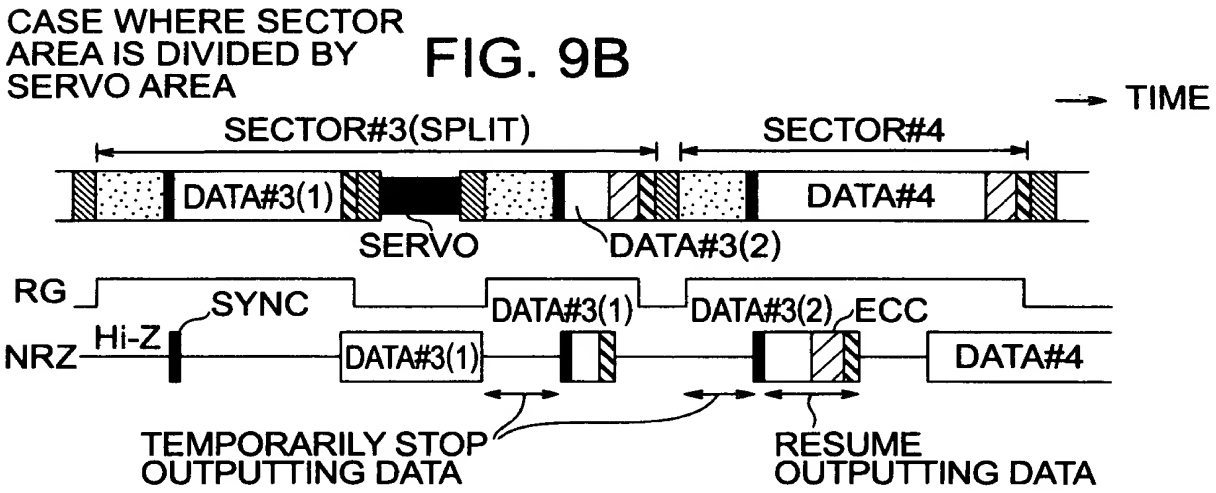
CASE WHERE SECTOR AREA IS DIVIDED BY SERVO AREA
TIME
SECTOR#3(SPLIT)
SECTOR#4
DATA#3(1)
DATA#4
SERVO
DATA#3(2)
RG
SYNC
DATA#3(1)
DATA#3(2)
ECC
NRZ
Hi-Z
DATA#3(1)
DATA#4
TEMPORARILY STOP OUTPUTTING DATA
RESUME OUTPUTTING DATA

FIG. 10A

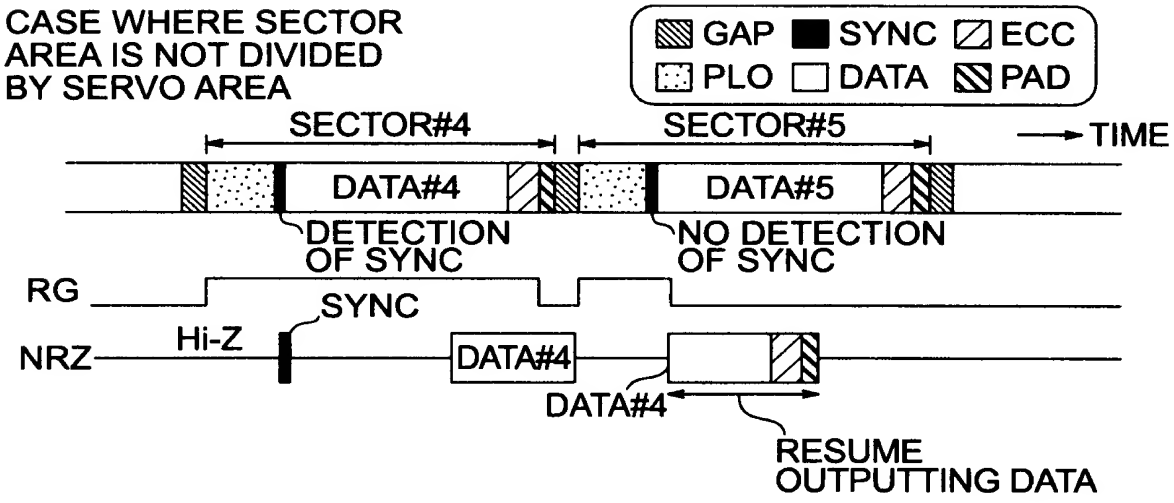

FIG. 10B

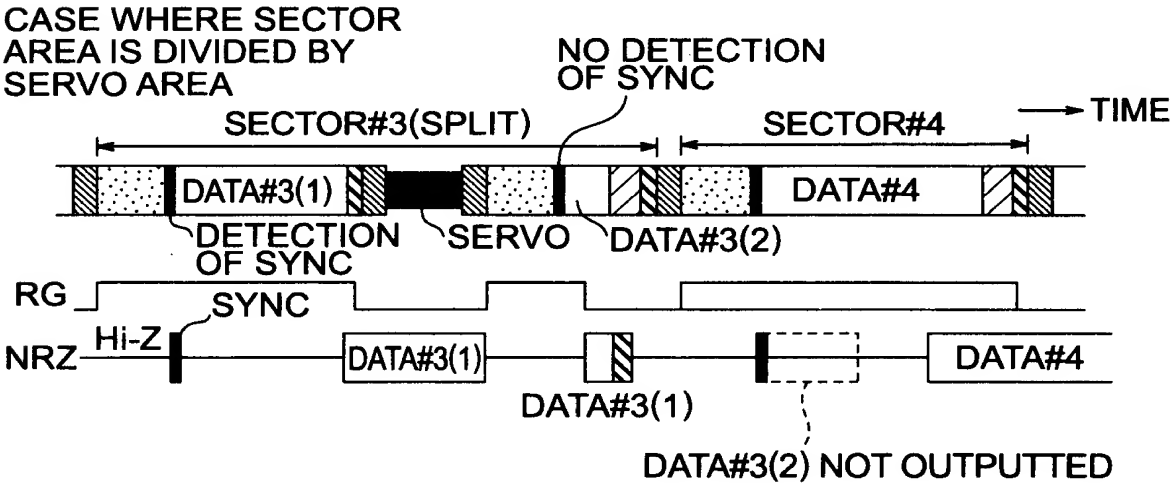

FIG. 11

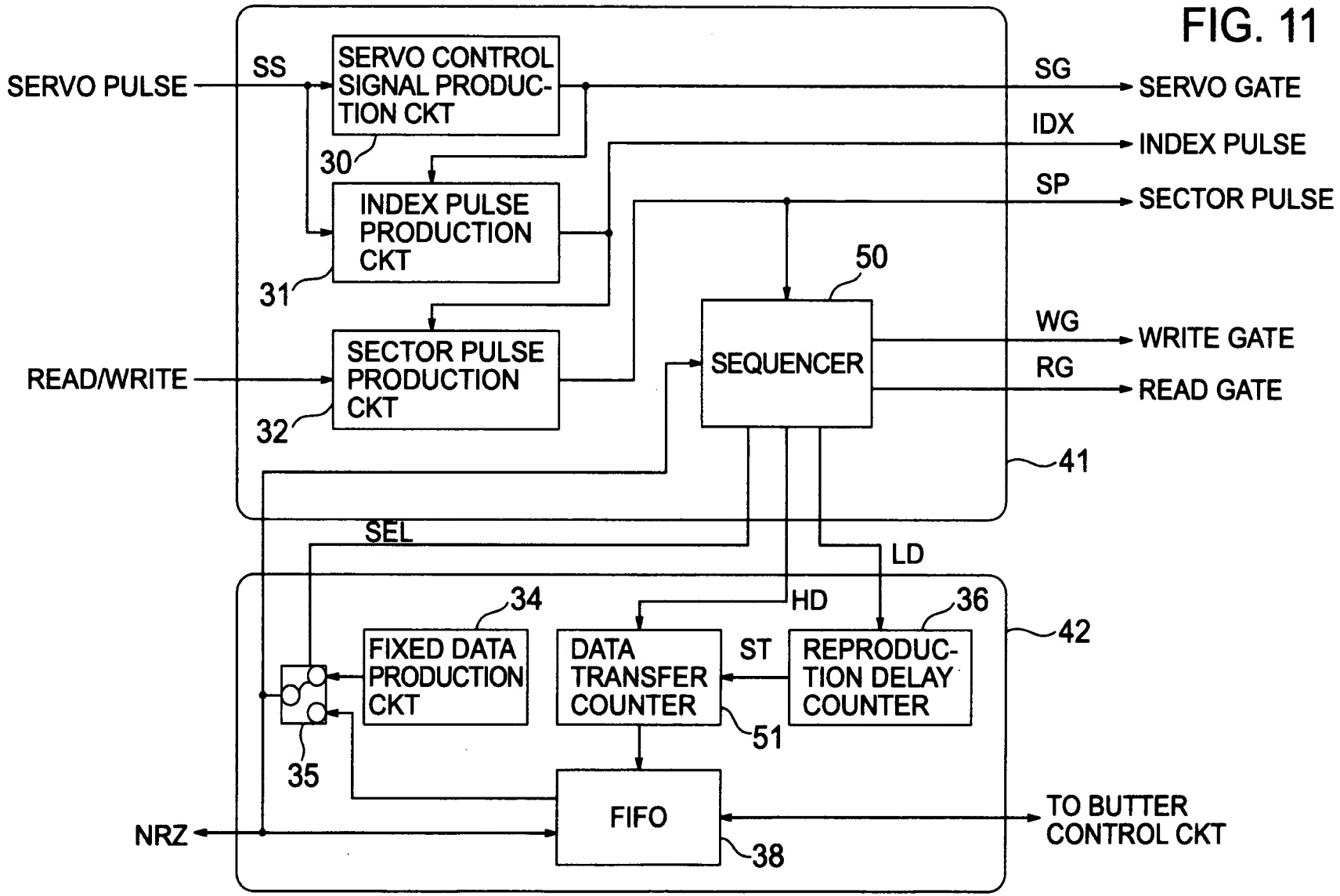
SERVO PULSE
SS
SERVO CONTROL SIGNAL PRODUCTION CKT
30
INDEX PULSE PRODUCTION CKT
31
SECTOR PULSE PRODUCTION CKT
32
READ/WRITE
SG
SERVO GATE
IDX
INDEX PULSE
SP
SECTOR PULSE
50
SEQUENCER
WG
WRITE GATE
RG
READ GATE
41
SEL
LD
34
HD
36
42
FIXED DATA PRODUCTION CKT
DATA TRANSFER COUNTER
ST
REPRODUCTION DELAY COUNTER
51
35
FIFO
38
NRZ
TO BUTTER CONTROL CKT

FIG. 12A

USUAL PROCESSING

	PROCESSING BY SEQUENCER 50	PROCESSING BY DATA FLOW CONTROL CKT 42
step1	ACTIVATE "RG" SIGNAL	TEMPORARILY STOP DATA TRANSFER WHEN DATA IS BEING TRANSFERRED
step2	SYNC DETECTED WITHIN FIXED PERIOD? (NRZ DATA=SYNC CODE)	TEMPORARILY STOP DATA TRANSFER
step3	WAIT DURING PRESCRIBED NUMBER OF BYTES	RESUME DATA TRANSFER WHEN DATA TRANSFER IS TEMPORARILY STOPPED
		WAIT DURING NUMBER OF REPRODUCTION DELAY BYTES AND THEN START TO TRANSFER DATA OF PRESCRIBED NUMBER OF BYTES
step4	INACTIVATE "RG" SIGNAL	DATA TRANSFER CONTINUES
step5	WAIT UNTIL SERVO PERIOD PASSES	DATA TRANSFER CONTINUES
step6	ACTIVATE "RG" SIGNAL	TEMPORARILY STOP DATA TRANSFER WHEN DATA IS BEING TRANSFERRED
step7	SYNC DETECTED WITHIN FIXED PERIOD? (NRZ DATA=SYNC CODE)	TEMPORARILY STOP DATA TRANSFER
step8	WAIT DURING PRESCRIBED NUMBER OF BYTES	RESUME DATA TRANSFER WHEN DATA TRANSFER IS TEMPORARILY STOPPED
		WAIT DURING NUMBER OF REPRODUCTION DELAY BYTES AND THEN START TO TRANSFER DATA OF PRESCRIBED NUMBER OF BYTES
step9	INACTIVATE "RG" SIGNAL	DATA TRANSFER CONTINUES

FIG. 12B

EXCEPTIONAL PROCESSING(WHEN SYNC CODE IS NOT DETECTED WITHIN PRESCRIBED TIME)

step1	INACTIVATE "RG" SIGNAL	RESUME DATA TRANSFER WHEN DATA TRANSFER IS TEMPORARILY STOPPED
step2	NOTIFY OCCURRENCE OF DATA ERROR WHEN SYNC IS NOT DETECTED IN STEP 7	STOP DATA TRANSFER

FIG. 13

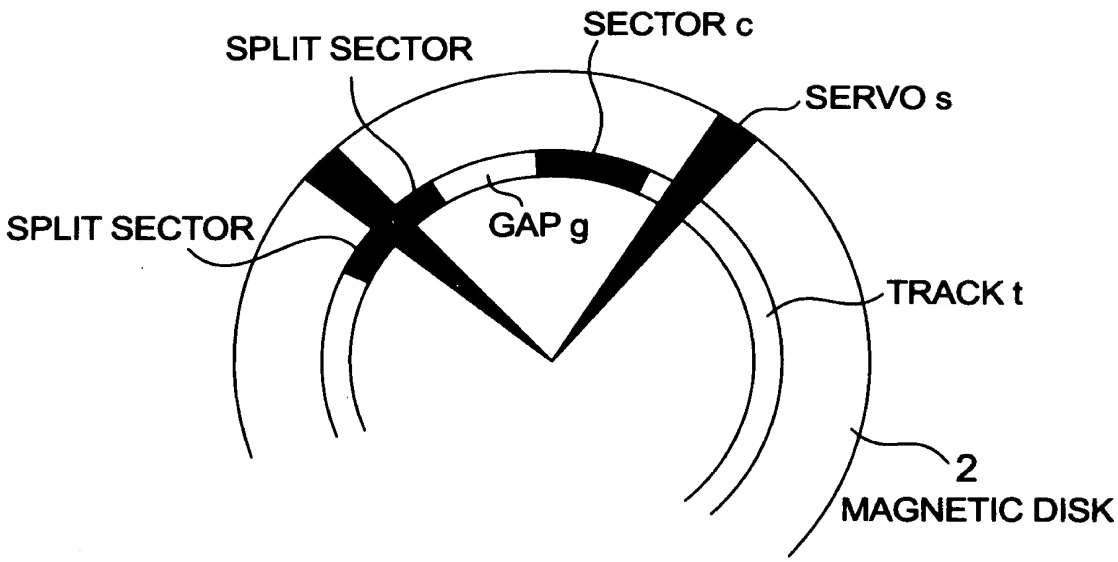
SECTOR c
SPLIT SECTOR
SERVO s
SPLIT SECTOR
GAP g
TRACK t
2
MAGNETIC DISK

FIG. 14A

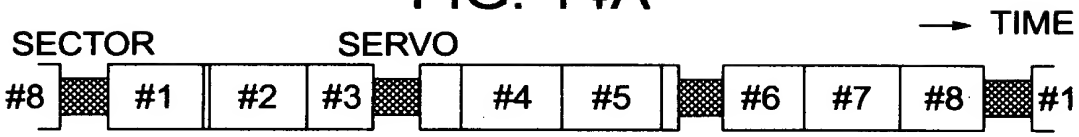

FIG. 14B

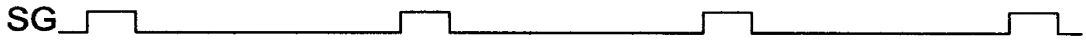

FIG. 14C

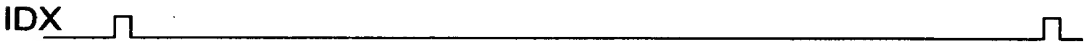

FIG. 14D

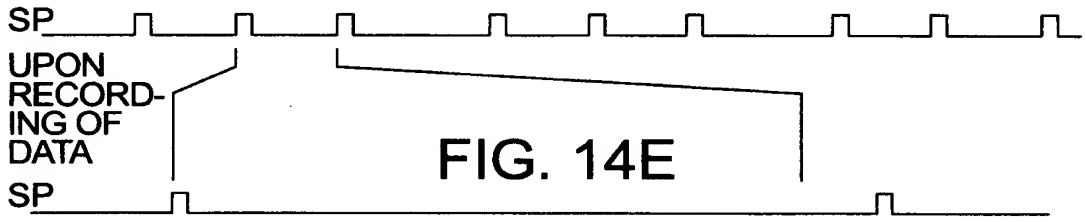

FIG. 14E

FIG. 14F

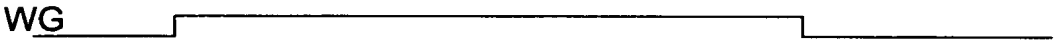

FIG. 14G

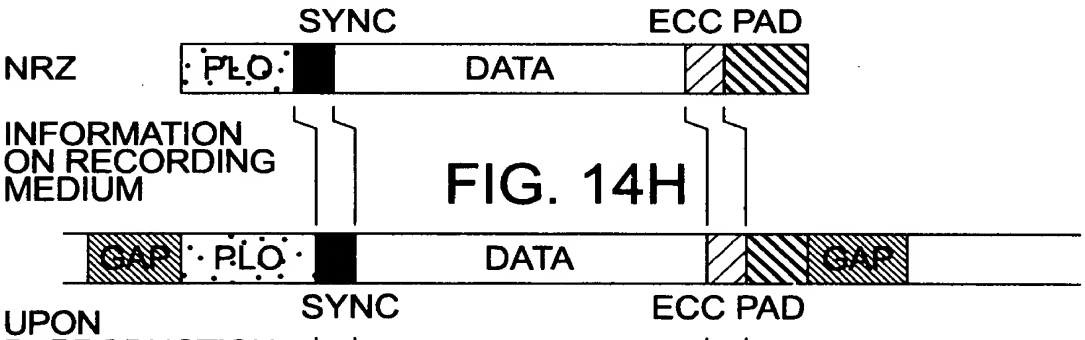

FIG. 14H

FIG. 14I

FIG. 14J

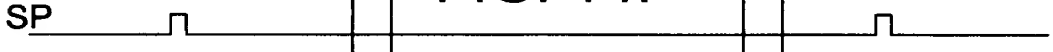

FIG. 14K

FIG. 15

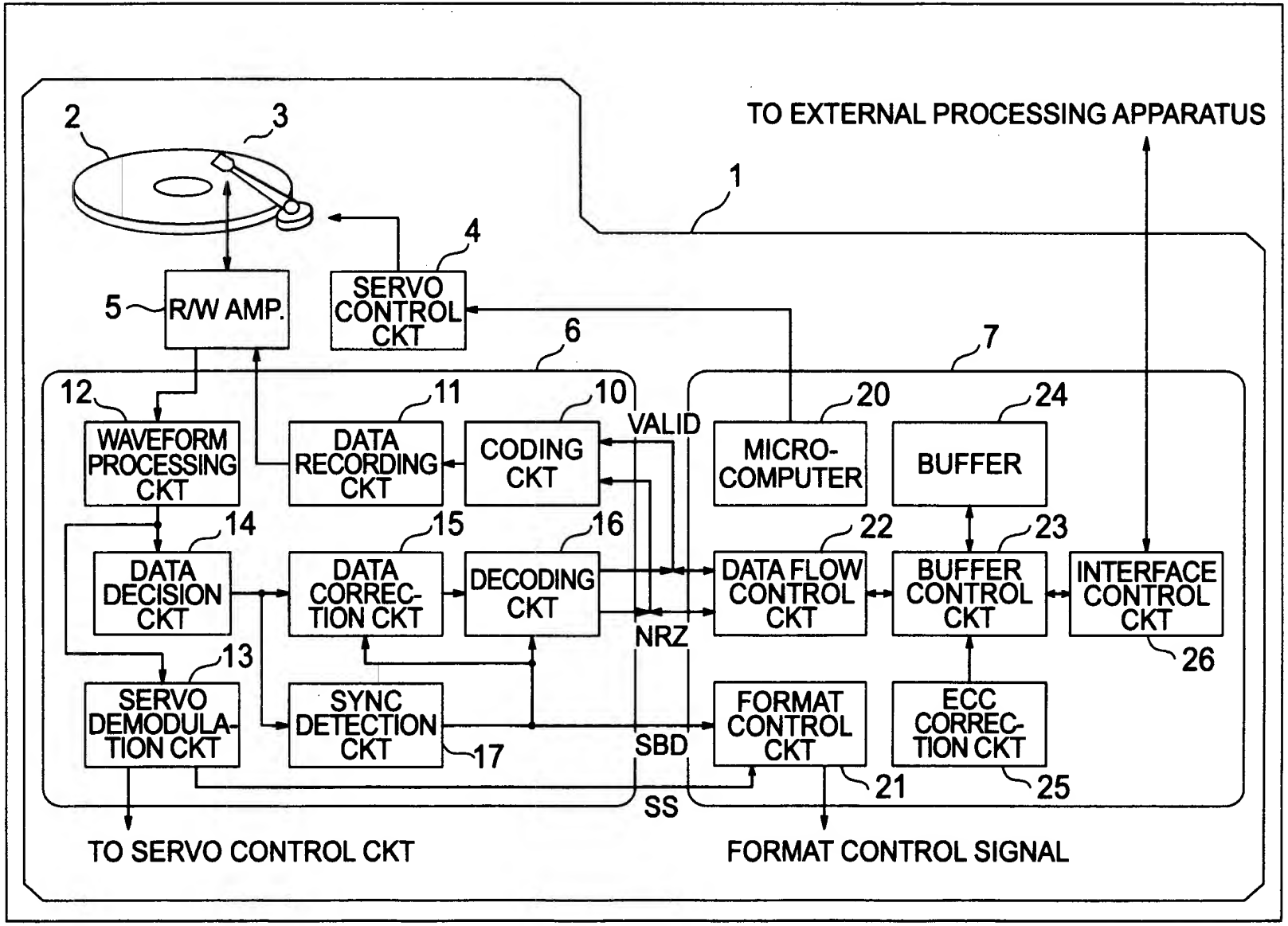
TO EXTERNAL PROCESSING APPARATUS
1
2
3
4
5
R/W AMP.
SERVO CONTROL CKT
6
7
12
WAVEFORM PROCESSING CKT
11
DATA RECORDING CKT
10
CODING CKT
VALID
20
MICRO-COMPUTER
24
BUFFER
14
DATA DECISION CKT
15
DATA CORREC-TION CKT
16
DECODING CKT
NRZ
22
DATA FLOW CONTROL CKT
23
BUFFER CONTROL CKT
INTERFACE CONTROL CKT
26
13
SERVO DEMODULA-TION CKT
SYNC DETECTION CKT
17
SBD
FORMAT CONTROL CKT
21
ECC CORREC-TION CKT
25
SS
TO SERVO CONTROL CKT
FORMAT CONTROL SIGNAL

FIG. 16

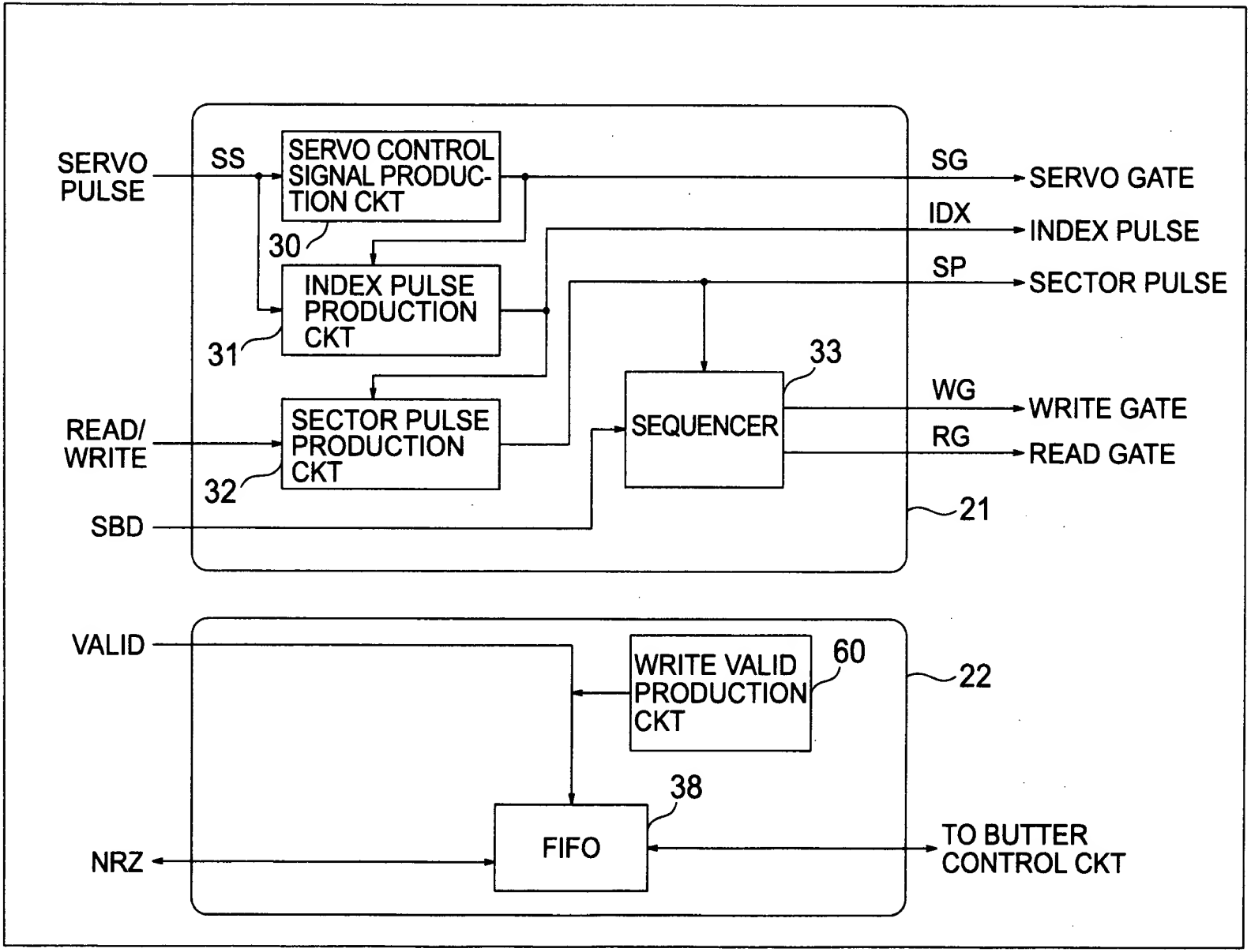
SERVO PULSE
SS
SERVO CONTROL SIGNAL PRODUC-TION CKT
30
INDEX PULSE PRODUCTION CKT
31
SECTOR PULSE PRODUCTION CKT
32
READ/ WRITE
SBD
SEQUENCER
33
SG
SERVO GATE
IDX
INDEX PULSE
SP
SECTOR PULSE
WG
WRITE GATE
RG
READ GATE
21
VALID
WRITE VALID PRODUCTION CKT
60
22
FIFO
38
NRZ
TO BUTTER CONTROL CKT

FIG. 17A

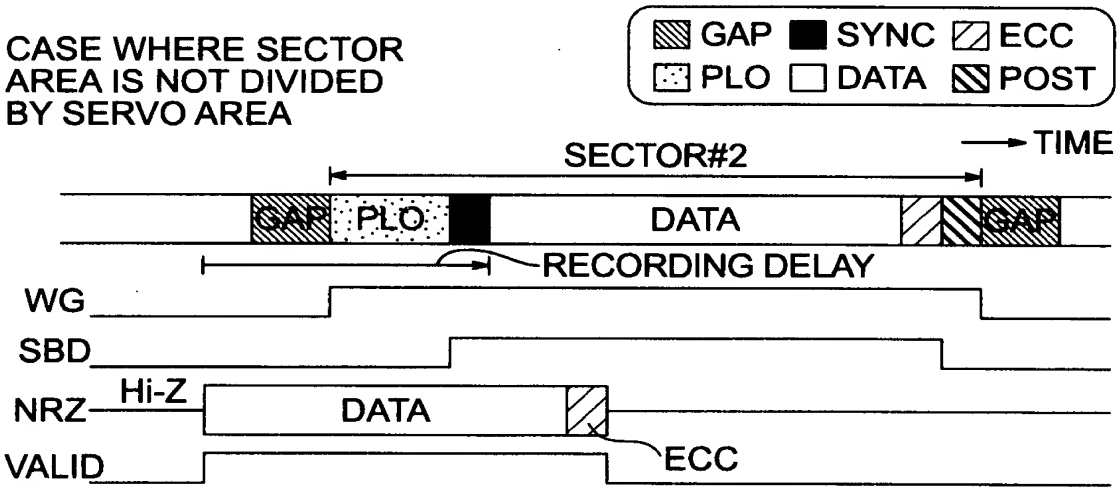

FIG. 17B

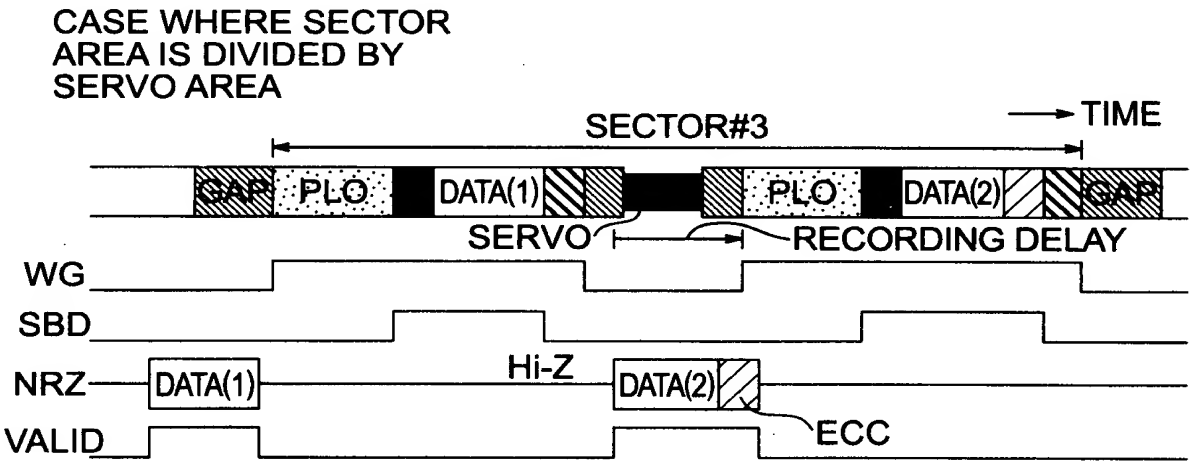

FIG. 18A

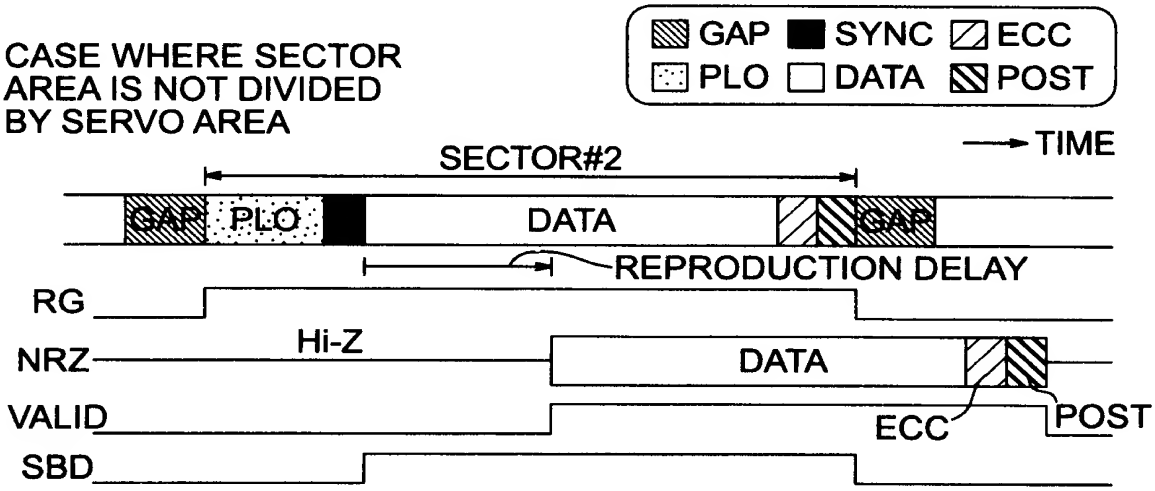

FIG. 18B

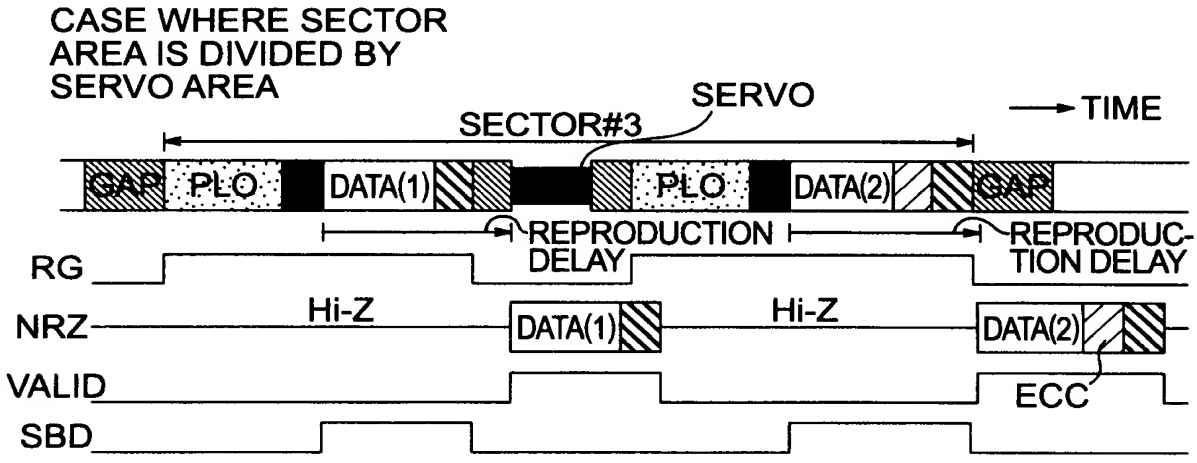

FIG. 19

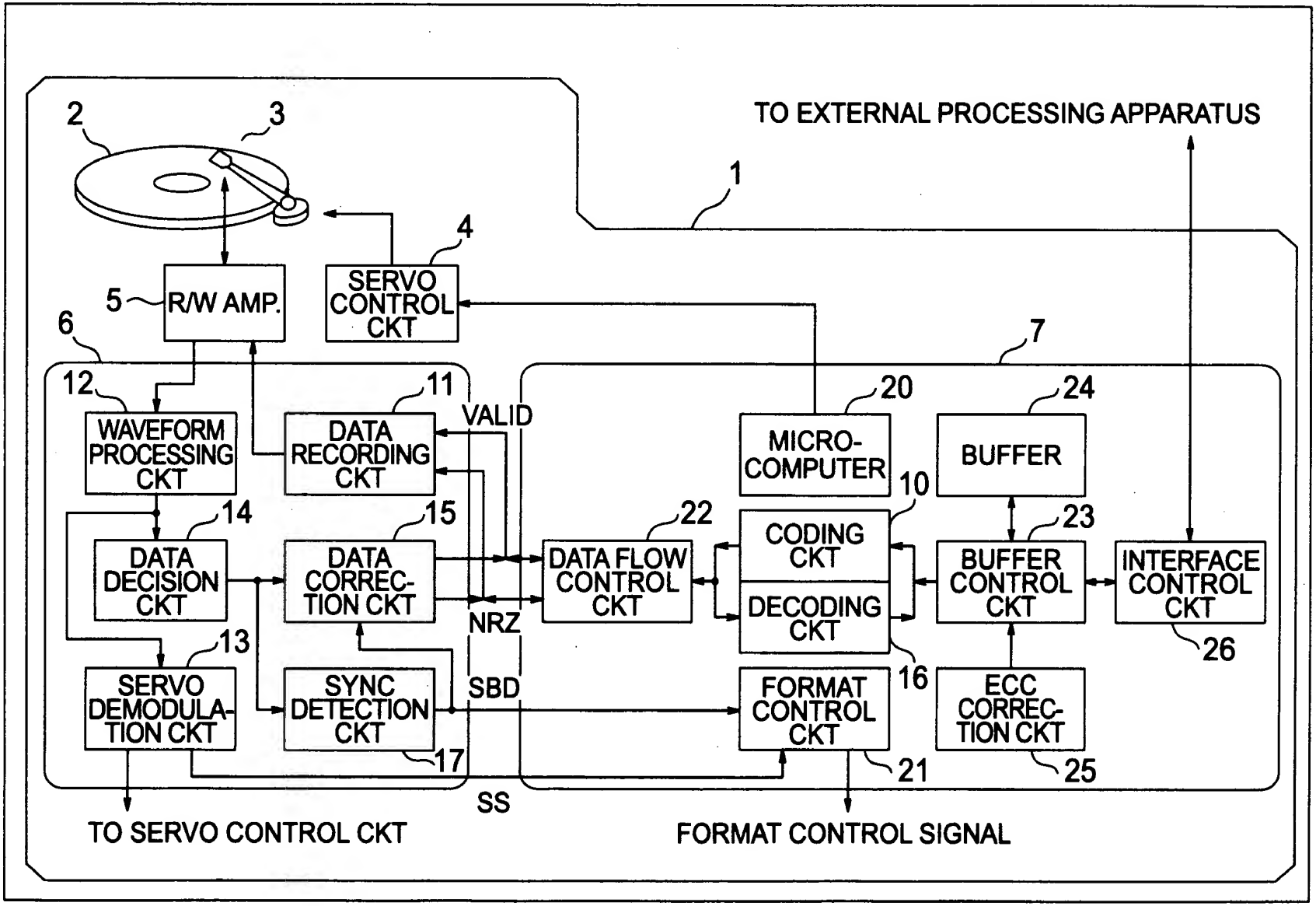

FIG. 20

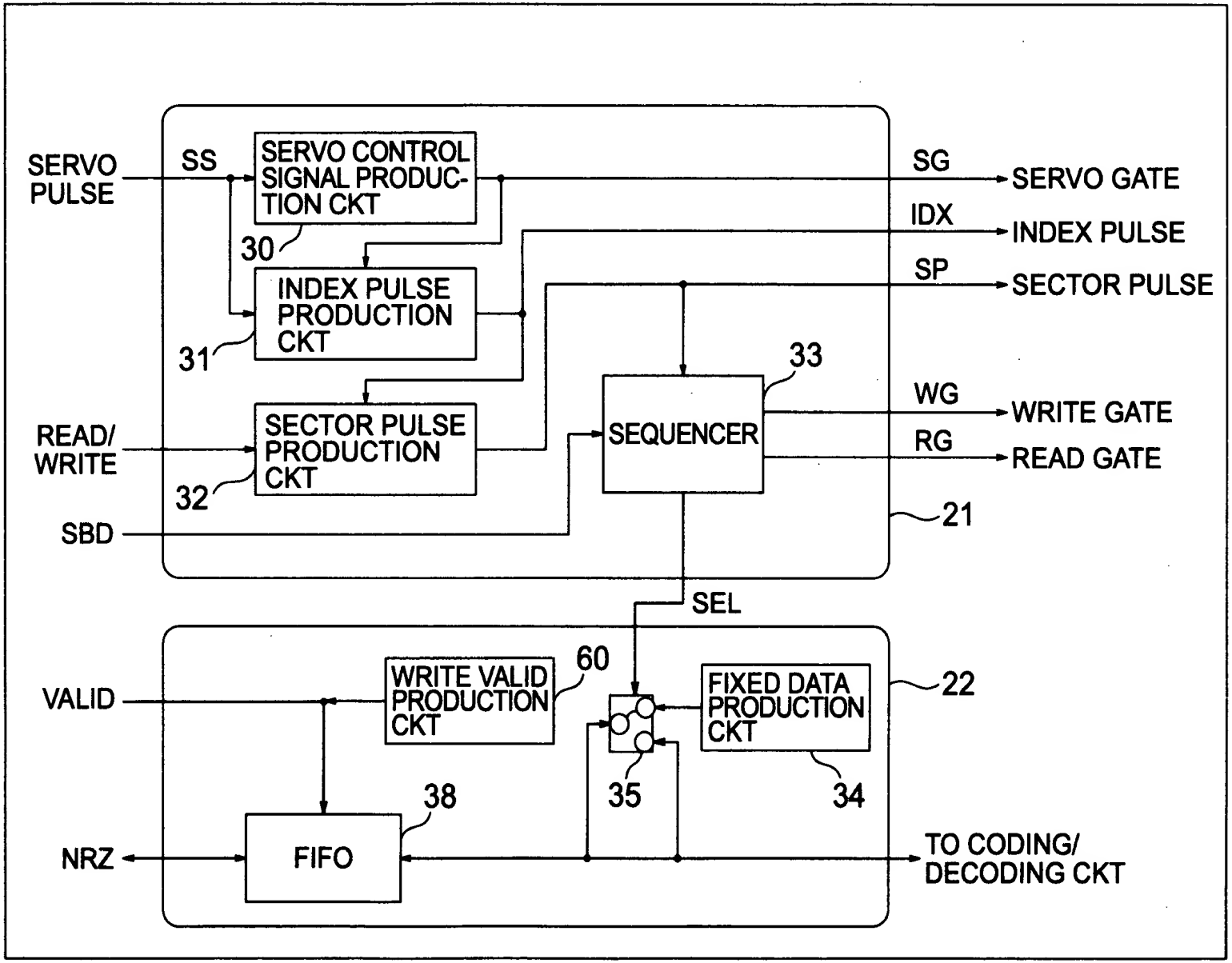
SERVO PULSE
SS
SERVO CONTROL SIGNAL PRODUC-TION CKT
30
INDEX PULSE PRODUCTION CKT
31
SECTOR PULSE PRODUCTION CKT
32
READ/ WRITE
SBD
SEQUENCER
33
SG
SERVO GATE
IDX
INDEX PULSE
SP
SECTOR PULSE
WG
WRITE GATE
RG
READ GATE
21
SEL
VALID
WRITE VALID PRODUCTION CKT
60
FIXED DATA PRODUCTION CKT
22
35
34
38
NRZ
FIFO
TO CODING/ DECODING CKT

FIG. 21A

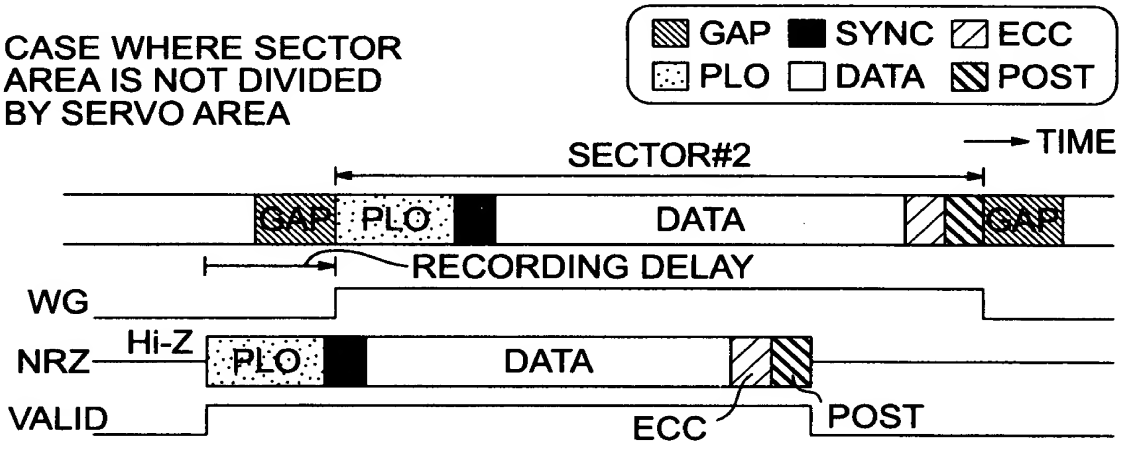

FIG. 21B